8-6-1965

Test 907: Nuffield 10 / 60 (Diesel)

Tractor Museum
University of Nebraska-Lincoln, TractorMuseumArchives@unl.edu

NEBRASKA TRACTOR TEST 907 - NUFFIELD 10 / 60 DIESEL

BELT POWER TAKE-OFF PERFORMANCE

	Hp	Crank-shaft speed rpm	Fuel Consumption Gal per hr	Fuel Consumption Lb per hp-hr	Hp-hr per gal	Temperature Degrees F Cooling medium	Temperature Degrees F Air wet bulb	Temperature Degrees F Air dry bulb	Barometer inches of Mercury
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours									
*	55.36	2000	3.907	0.490	14.17	191	68	75	29.000
Standard Power Take-off Speed (540 rpm)—One Hour									
	43.17	1430	2.892	0.465	14.93	190	68	75	29.000
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS									
	49.10	2088	3.295	0.466	14.90	178	68	76	.....
	0.00	2183	1.032	.....	.....	132	67	74	.....
	25.09	2134	2.099	0.581	11.95	152	67	75	.....
	55.18	2000	3.925	0.494	14.06	191	70	75	.....
	12.71	2161	1.546	0.845	8.22	142	67	73	.....
	37.22	2109	2.630	0.491	14.15	162	67	74	.....
Av	**29.88**	**2113**	**2.421**	**0.563**	**12.34**	**159**	**68**	**74**	**29.000**

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank-shaft speed rpm	Slip of drivers %	Fuel Consumption Gal per hr	Fuel Consumption Lb per hp-hr	Hp-hr per gal	Temp Degrees F Cool-ing med	Temp Degrees F Air wet bulb	Temp Degrees F Air dry bulb	Barom-eter inches of Mercury
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—5th Gear (3rd Lo)											
45.95	5128	3.36	2004	7.96	3.779	0.571	12.16	198	68	83	29.060
75% of Pull at Maximum Power—Ten Hours—5th Gear (3rd Lo)											
38.81	4015	3.63	2118	6.08	3.030	0.542	12.81	184	67	85	28.969
50% of Pull at Maximum Power—Two Hours—5th Gear (3rd Lo)											
27.63	2768	3.74	2142	4.11	2.320	0.583	11.91	164	68	88	29.045
MAXIMUM POWER WITH BALLAST											
41.63	7667	2.04	2094	14.87	3rd Gear (2nd Lo)			170	68	88	29.000
45.55	6627	2.58	2000	10.92	4th Gear (2nd Hi)			198	68	87	29.000
47.94	5361	3.35	2003	8.17	5th Gear (3rd Lo)			188	64	72	29.060
47.85	4137	4.34	2001	6.20	6th Gear (3rd Hi)			191	67	77	29.060
47.79	2845	6.30	2004	4.21	7th Gear (4th Lo)			190	67	77	29.060
47.67	2212	8.08	2003	3.02	8th Gear (4th Hi)			190	68	87	29.000
46.02	1256	13.74	2010	1.72	9th Gear (5th Lo)			181	68	87	29.000
MAXIMUM POWER WITHOUT BALLAST											
37.18	4179	3.34	2117	14.79	5th Gear (3rd Lo)			190	74	97	28.860

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—5th Gear (3rd Lo)

Pounds pull	5361	5537	5725	5812	5870	5802
Horsepower	47.94	44.08	40.42	35.88	31.09	25.70
Crankshaft speed rpm	2003	1790	1595	1397	1200	1003
Miles per hour	3.35	2.99	2.65	2.31	1.99	1.66
Slip of drivers %	8.17	8.53	9.01	9.01	9.24	9.01

TIRES, BALLAST and WEIGHT		**With Ballast**	**Without Ballast**
Rear tires	—No, size, ply & psi	Two 16.9-30; 6; 16	Two 16.9-30; 6; 16
Ballast	—Liquid	730 lb each	None
	Cast iron	1100 lb each	None
Front tires	—No, size, ply & psi	Two 7.50-16; 6; 32	Two 7.50-16; 6; 20
Ballast	—Liquid	90 lb each	None
	Cast iron	235 lb each	None
Height of drawbar		20½ inches	21½ inches
Static weight	—Rear	7350 lb	3690 lb
	Front	2650 lb	2000 lb
Total weight with operator		10175 lb	5865 lb

Department of Agricultural Engineering

Dates of Test: AUGUST 6 to AUGUST 12, 1965

Manufacturer: THE BRITISH MOTOR CORPORATION, LONGBRIDGE, BIRMINGHAM, ENGLAND

FUEL, OIL and TIME Fuel No 2 Diesel **Cetane No** 57.0 (rating taken from oil company's typical inspection data) **Specific gravity converted to 60°/60°** 0.8343 **Weight per gallon** 6.947 lb **Oil** SAE 20-20W **API service classification** MS, DS **To motor** 2.469 gal **Drained from motor** 1.668 gal **Transmission and final-drive lubricant** SAE 90 **Total time engine was operated** 57½ hours.

ENGINE Make B.M.C. Diesel **Type** 4 cylinder vertical **Serial No** 38T1257D36005 **Crankshaft mounted** lengthwise **Rated rpm** 2000 **Bore and stroke** 3.937" x 4.724" **Compression ratio** 16.5 to 1 **Displacement** 230 cu in **Cranking system** 12 volt electric (two 6 volt batteries) **Lubrication** pressure **Air cleaner** oil washed wire mesh **Oil filter** replaceable micronic paper element **Fuel filter** replaceable laminated paper element **Muffler** was used **Cooling medium temperature control** thermostat and shutters.

CHASSIS Type Standard **Serial No** 60N66161 **Tread width** rear 60" to 70" front 53" to 74½" **Wheel base** 78" **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 26½" Vertical distance above roadway 33" Horizontal distance from center of rear wheel tread 0" to the right/left **Hydrualic control system** direct engine drive which can be disconnected except during PTO operation **Transmission** selective gear fixed ratio **Advertised speeds mph** first 1.42 second 1.8 third 2.24 fourth 2.84 fifth 3.58 sixth 4.54 seventh 6.44 eighth 8.18 ninth 13.66 tenth 17.36 reverse 4.14 and 5.26 **Clutch** single plate dry disc operated by foot pedal **Brakes** Twin disc brakes operated by two foot pedals and a hand lever **Steering** no power assist **Turning radius** (on concrete surface with brake applied) right 126" left 126" (on concrete surface without brake) right 144" left 144" **Turning space diameter** (on concrete surface with brake applied) right 258" left 258" (on concrete surface without brake) right 294" left 294" **Belt pulley** 1325 rpm at 1800 engine rpm diam 9" face 6½" Belt speed 3123 fpm **Power take-off** 540 rpm at 1430 engine rpm.

REPAIRS and ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data obtained in accordance with the SAE and ASAE test code.

First and second gears were not run as it was necessary to limit the pull in third gear to avoid excessive wheel slippage. Tenth gear was not run as it exceeded 15 mph.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 907.

L. F. LARSEN
Engineer-in-Charge

G. W. STEINBRUEGGE, Chairman
J. J. SULEK
D. E. LANE
Board of Tractor Test Engineers

The University of Nebraska Agricultural Experiment Station
E. F. Frolik, Dean; H. H. Kramer, Director, Lincoln, Nebraska

EXPLANATION OF TEST REPORT

GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories can be disconnected only when it is convenient for the operator to do so in practice. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer's published recommendations. The manufacturer's representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. The tire tread-bar height must be at least 65% of new tread height prior to the maximum power run.

BELT OR POWER TAKE-OFF PERFORMANCE

Maximum Power and Fuel Consumption. The manufacturer's representaitve makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the belt pulley or the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

Varying Power and Fuel Consumption. Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque, ½ of the 85% torque; maximum power, ¼ and ¾ of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general usage.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests. If the manufacturer specifies a different rated crankshaft speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified by the manufacturer in the operating instructions.

Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effect of speed-control devices (engine, governor, automatic transmission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; and (3) 50% of the pull at maximum power. Prior to 1958, fuel consumption data (10 hour test) were shown only for the pull obtained at maximum power for tractors having torque converters and at 75% of the pull obtained at maximum power for gear-type tractors.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 12 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe-limit for the test course. The maximum safe speed for the Nebraska Test Course has been set at 15 miles per hour. The slippage limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Maximum Power Without Ballast. All added ballast is removed from the tractor. The maximum drawbar power of the tractor is determined by the same procedure used for getting maximum power with ballast. The gear (or travel speed) is the same as that used in the 10-hour test.

Varying Power and Travel Speed with Ballast. Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions: (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

For additional information about the **Nebraska Tractor Tests** write to the **Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska.**

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